

NOTES ON THE FEEDING HABITS OF SCORPION-FLIES (MECOPTERA: PANORPIDAE).

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The classical theory that adult Panorpid, or scorpion-flies, are predatory has no basis in fact. I refer to the observations of Felt (Tenth Report, N. Y. State, Entom pp. 463-480, 1893), in America, of Champion (The Entomologist, Vol. xlv, p. 322, 1912 in England, and of Miyake (Journ. Coll. Agric. Tokyo, Vol. iv, pp. 117-139, 1912), in Japan, all of which tend to establish that these interesting creatures feed upon dead animal matter, but never prey upon the living. Moreover, Miyake noted that *Panorpa klugi* M'Lach., which he studied in captivity sometimes feeds upon flowers, causing the petals to drop. Later, he (Ibid, pp. 265-400, 1913) reported observing in the fields "many scorpion-flies (*P. klugi*) swarming about a shrub and eagerly sucking its juicy fruits."

In connection with these observations, I wish to put on record here, that two species of scorpion-flies common in the vicinity of Ithaca, N. Y., namely *Panorpa rufescens* Ramb. and *P. maculosa* Hagen will in captivity feed upon raspberries, strawberries, cherries, sliced bananas and apples just as readily as upon dead wasps, house flies, caterpillars, spiders, etc. A few specimens were kept in a glass jar, containing a little moist earth in the bottom, and care was taken to provide them with dead insects along with the fruits. The scorpion-flies showed apparently an equally keen appetite for the animal and plant food. These observations, made in the summer of 1920, and again in 1922, taken together with Miyake's reports mentioned above, seem to show conclusively that adult Panorpid are mixed eaters, and that they cannot be called carnivorous as is commonly done in text-books.

A few words may be said regarding the method of feeding. Anatomically, because of the biting type of the mouth-parts, scorpion-flies may seem to be biting insects. By carefully

observing many individuals during their feeding, however, it occurred to me that they must be regarded primarily as sucking insects, rather than as biting ones. They were often seen practically motionless with their long "beaks" deeply inserted in their food substances. When they feed on insects, they first bite a hole through the chitinous skin, and then appear to suck the body fluid. It would seem probable that the long rostrum provided with biting mouth-parts at the end, so characteristic of this group of insects, is an adaptive developed in relation to these interesting feeding habits.

It may not be amiss to add, in conclusion, that the excreta of the scorpion-flies under consideration are always of liquid nature, as might be expected if they were sucking insects. In no case was there observed any solid or semisolid excrement, such as that of a biting insect.

NOTES ON THE GIPSY MOTH IN MY UNSPRAYED
WOODS AT EAST MARION, MASS.

1922.

BY FRED C. BOWDITCH, Brookline, Mass.

The Gipsy has been increasing in numbers for the last two seasons and I judged that this year would be the high-water mark of their infestation. My woods near the house include a grove of oaks (largely white) and another group of oaks and white pine, and various detached oaks between.

The caterpillars have the habit before pupating of bunching together, sometimes in great numbers along the trunk of the tree or under a branch. They spin a slight web and pupate in more or less of a loose mass; others in numbers of up to, say, ten or twelve, curl up in the leaves, or their remains, rather tending to keep at the ends of the branches, drawing the parts together in a loose bunch.

About the middle of June the caterpillars were very plenty and the trees began to look thin. The Calosomas (green) were